MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2016/2017

PTM0145 – TRIGONOMETRY

(Foundation in Information Technology)

29 MAY 2017
9.00 a.m. – 11.00 a.m.
(2 hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **ONE** page excluding the cover page and the Appendix.

2. Answer **ALL FIVE** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please write all your answers in the Answer Booklet provided.

4. All necessary working steps **MUST** be shown.

Instruction: Answer all **FIVE** questions.

Question 1 [10 marks]

Given the complex numbers $z = 3 + 7i$ and $w = -2 - i$.

a. Write the polar forms of z and w. (5 marks)

b. Use the polar forms of z_1 and z_2 to write the polar forms of z^3, zw, and $\frac{z}{w}$. (5 marks)

Question 2 [10 marks]

Given the equation of the ellipse $49x^2 + 25y^2 - 392x + 200y - 41 = 0$.

a. Find the center, foci and vertices of the ellipse. (7 marks)

b. Sketch the ellipse. (3 marks)

Question 3 [10 marks]

a. Given $\cos\alpha = -\frac{7}{9}$, $\frac{\pi}{2} < \alpha < \pi$, and $\sin\beta = -\frac{4}{11}$, $\frac{3\pi}{2} < \beta < 2\pi$.
Find the exact value of $\cos(\alpha + \beta)$ and $\cos 2\beta$. (7 marks)

b. Solve the equation $2\sin(3x - \pi) = 2$, $0 \le x \le 2\pi$. (3 marks)

Question 4 [10 marks]

The sides of a triangle is given by $a = 18$ cm, $b = 14$ cm and $c = 10$ cm.

a. Find the angles of the triangle (in degrees). (8 marks)

b. Find the area of the triangle. (2 marks)

Question 5 [10 marks]

Solve the given system of linear equation by using the inverse method.

$$2x + 8y = 56$$
$$5x - y + z = -13$$
$$2y - z = 20$$

(10 marks)

End of Paper

APPENDIX

Trigonometry Identities

$$\cos^2 A + \sin^2 A = 1 \qquad \sec^2 A = 1 + \tan^2 A \qquad \csc^2 A = 1 + \cot^2 A$$

$$\cos(A+B) = \cos A\cos B - \sin A\sin B$$
$$\cos(A-B) = \cos A\cos B + \sin A\sin B$$
$$\sin(A+B) = \sin A\cos B + \cos A\sin B$$
$$\sin(A-B) = \sin A\cos B - \cos A\sin B$$
$$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A\tan B}$$
$$\tan(A-B) = \frac{\tan A - \tan B}{1 + \tan A\tan B}$$

$$\cos 2A = \cos^2 A - \sin^2 A$$
$$= 2\cos^2 A - 1 = 1 - 2\sin^2 A$$
$$\sin 2A = 2\sin A\cos A$$
$$\tan 2A = \frac{2\tan A}{1 - \tan^2 A}$$

$$\sin A\cos B = \frac{1}{2}\left[\sin(A+B) + \sin(A-B)\right]$$
$$\cos A\cos B = \frac{1}{2}\left[\cos(A+B) + \cos(A-B)\right]$$
$$\sin A\sin B = \frac{1}{2}\left[\cos(A-B) - \cos(A+B)\right]$$

$$\sin A + \sin B = 2\sin\frac{A+B}{2}\cos\frac{A-B}{2} \qquad \sin A - \sin B = 2\cos\frac{A+B}{2}\sin\frac{A-B}{2}$$

$$\cos A + \cos B = 2\cos\frac{A+B}{2}\cos\frac{A-B}{2} \qquad \cos A - \cos B = -2\sin\frac{A+B}{2}\sin\frac{A-B}{2}$$

$$\sin^2\frac{A}{2} = \frac{1-\cos A}{2} \qquad \cos^2\frac{A}{2} = \frac{1+\cos A}{2} \qquad \tan^2\frac{A}{2} = \frac{1-\cos A}{1+\cos A}$$

$$\sin\frac{A}{2} = \pm\sqrt{\frac{1-\cos A}{2}} \qquad \cos\frac{A}{2} = \pm\sqrt{\frac{1+\cos A}{2}} \qquad \tan\frac{A}{2} = \pm\sqrt{\frac{1-\cos A}{1+\cos A}}$$

$$\tan\frac{A}{2} = \frac{1-\cos A}{\sin A} = \frac{\sin A}{1+\cos A}$$